Applications of the Ameriflux Cyberinfrastructure Prototype

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Introduction

- Prototype used in revisions to a paper analyzing soil moisture dynamics at four AmeriFlux sites
- Example plots shown in this presentation:
  - No need for creation of advanced spreadsheets or programs
  - Plots took approximately15 minutes each to create, start to finish

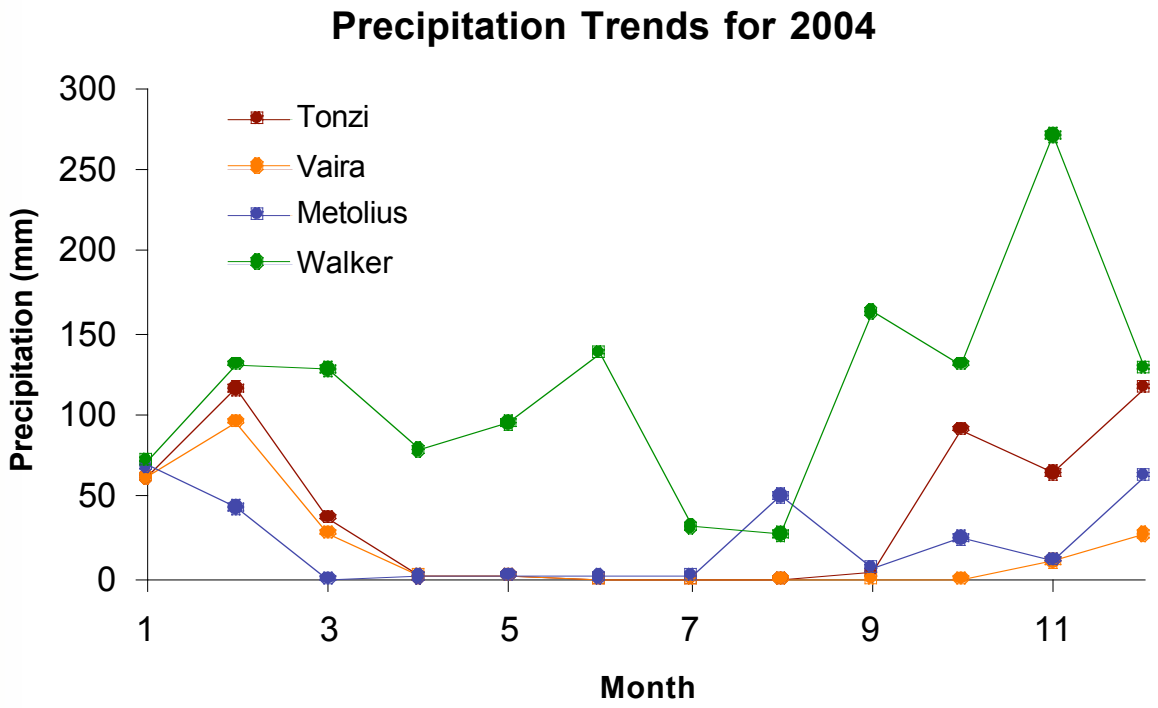
Comments on initial experience

- Advantages:
  - Greatly simplifies data management
  - Decreases time spent performing repetitive calculations
  - Aids in viewing data from multiple sites
- Challenges:
  - Many analyses need gap filled data
  - Some ways of displaying data can mask missing or unreasonable values

Uses of prototype for paper

- Find seasonal sums of precipitation and average days between rainfall events
- Perform conversions on latent heat data from W m^{-2} to mm d^{-1} within database
- Calculate $ET_{potential}$ and compare to ET_{actual}
- Fit curve to plot of daily R_{net} vs. precipitation

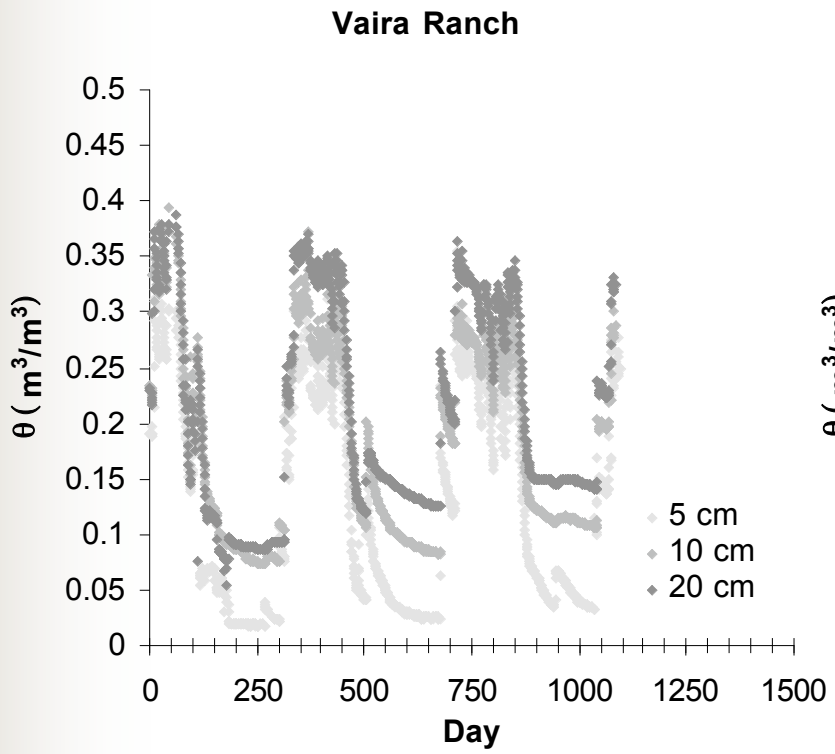
Precipitation trends and totals

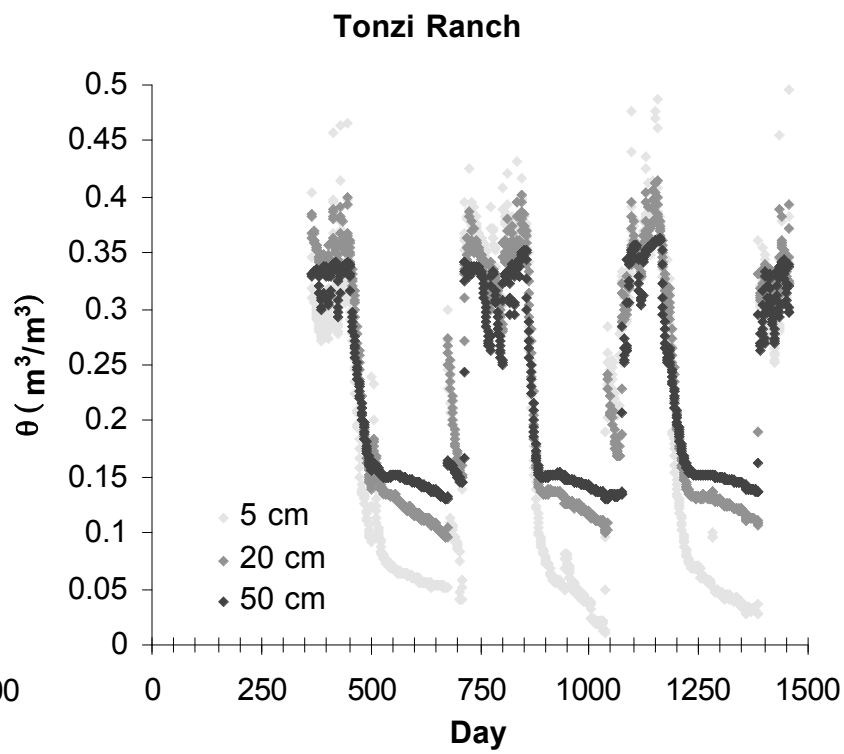


Summer precipitation:

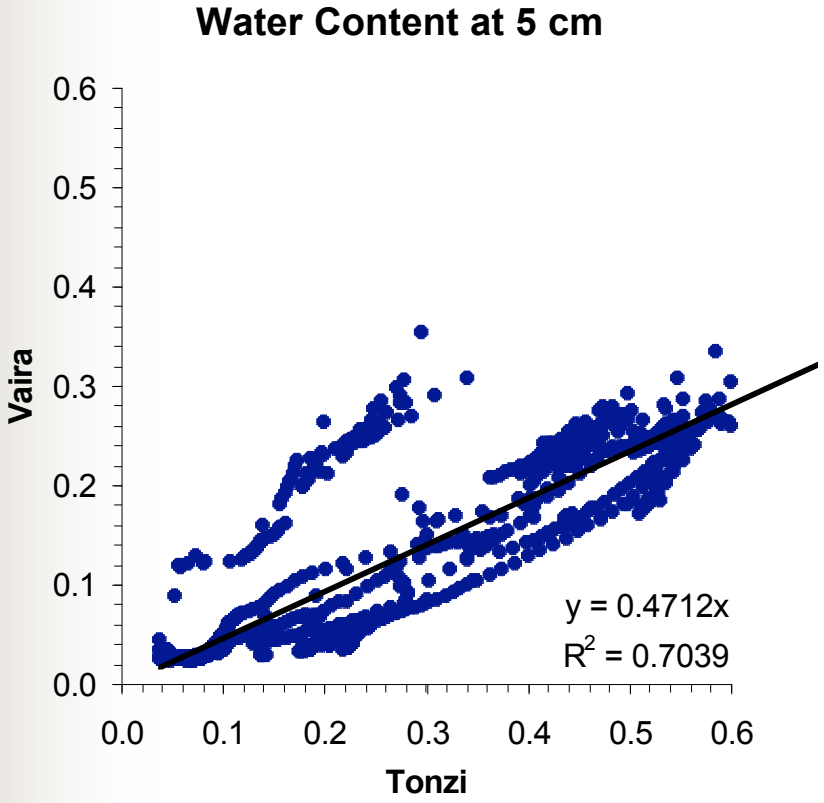
- Tonzi and Vaira ~ 2% of total
- Metolius ~ 24% of total
- Walker Branch ~ 40% of total

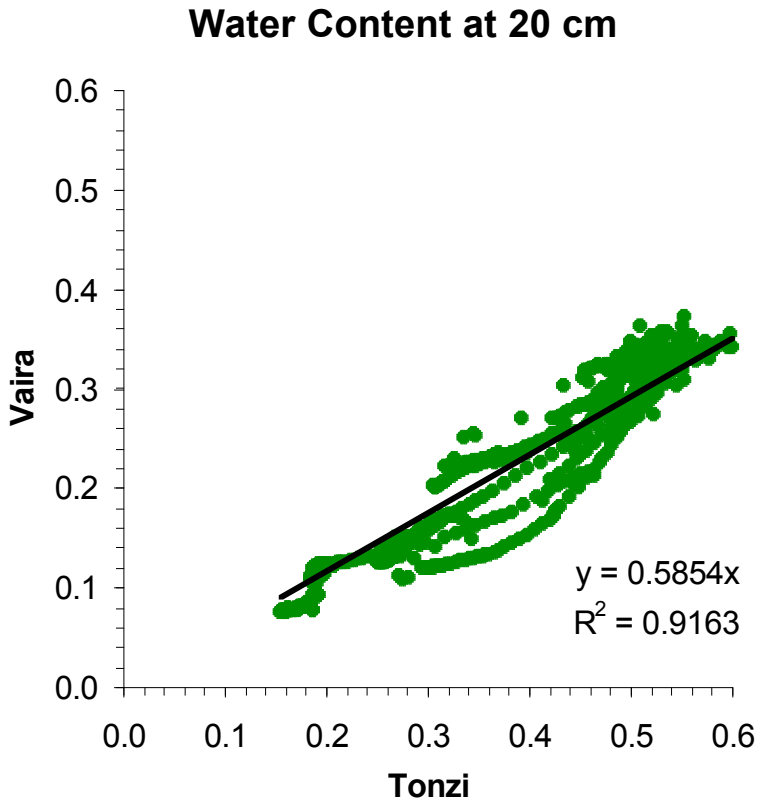
Daily averages of soil moisture





Comparison of soil moisture





Calculation of $LE_{potential}$

- Provided team with Priestly-Taylor equation and equations to convert to mm d^{-1}
- Needs gap filled data to correctly calculate sum

$$E_{pot} = 1.26\frac{s}{s+\gamma}(RNET - G1)$$

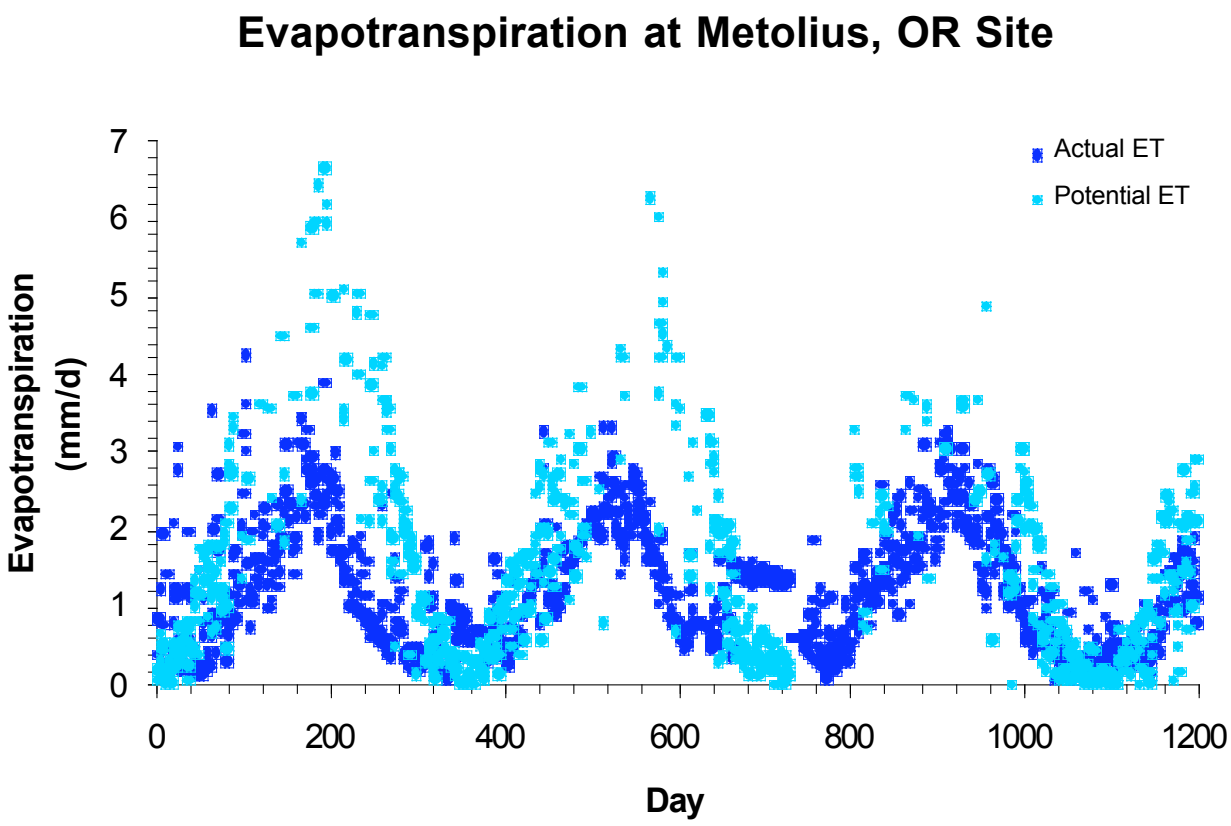
$$\lambda = (2.501 - 0.00236 * TA) * 10^3$$

$$\gamma = \frac{1.006 * PA}{0.622 * \lambda}$$

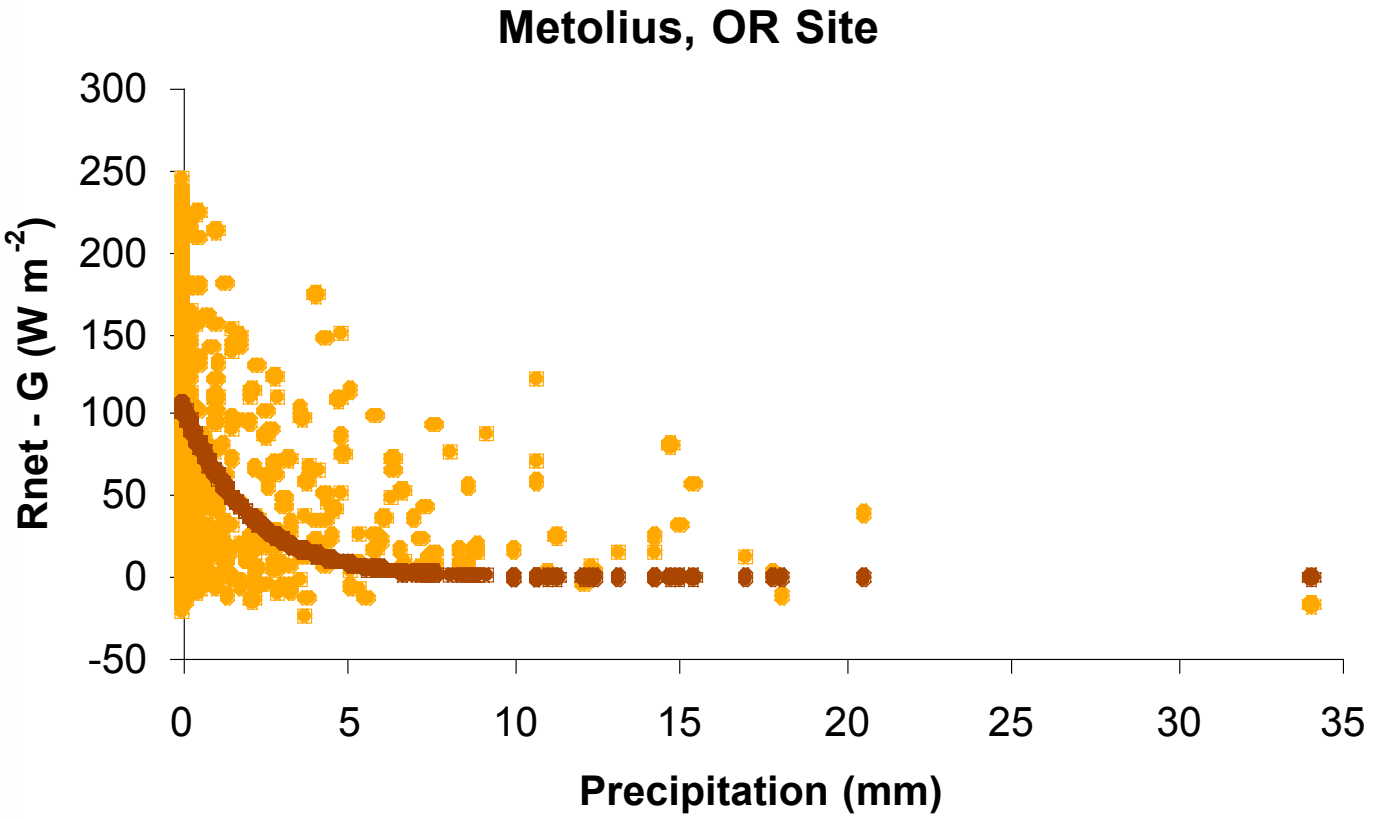
$$s = \frac{4217.5 * e_s(TA)}{(240.97 + TA)^2}$$

$$e_s(TA) = 0.611\exp\left(\frac{17.27 * TA}{237.3 + TA}\right)$$

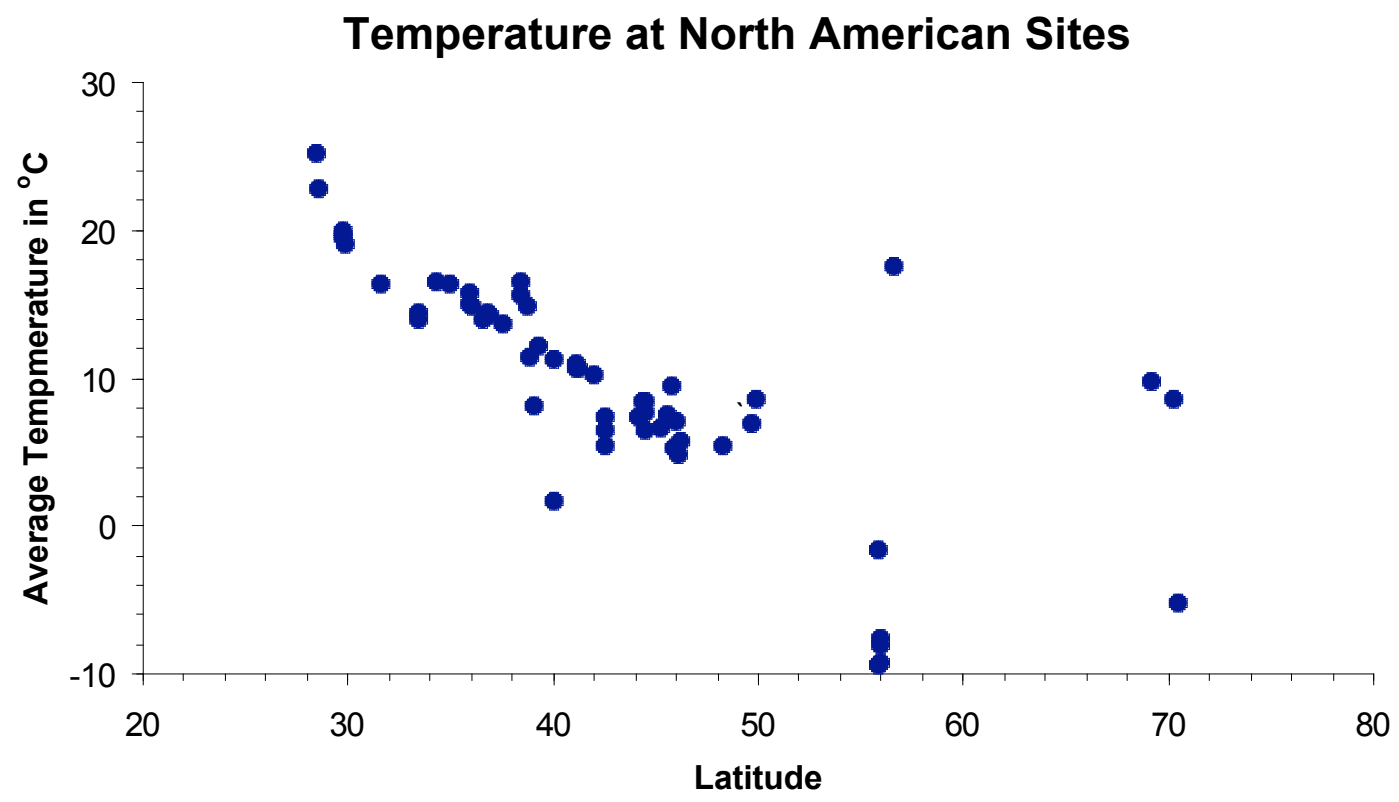
Comparison of ET calculations



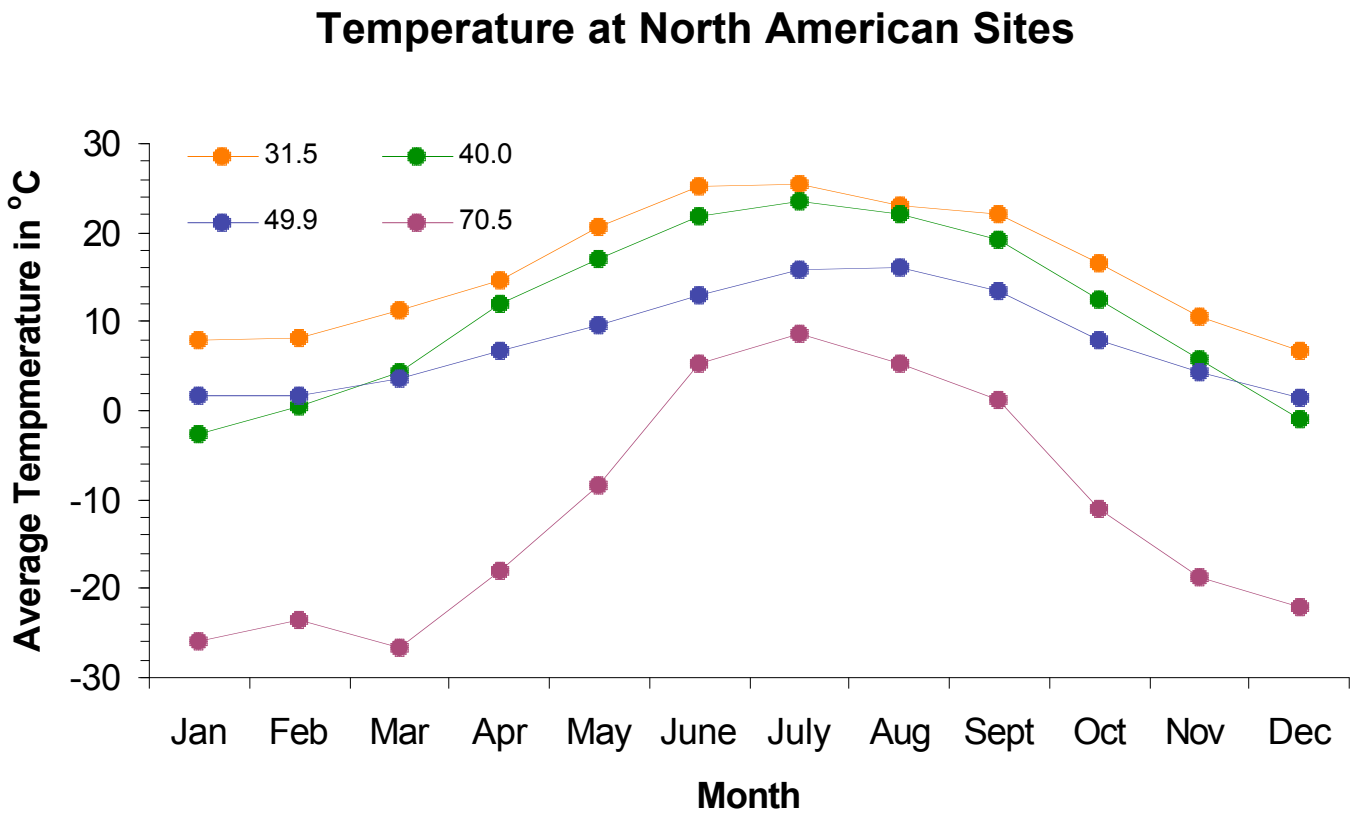
Relating net radiation and precipitation



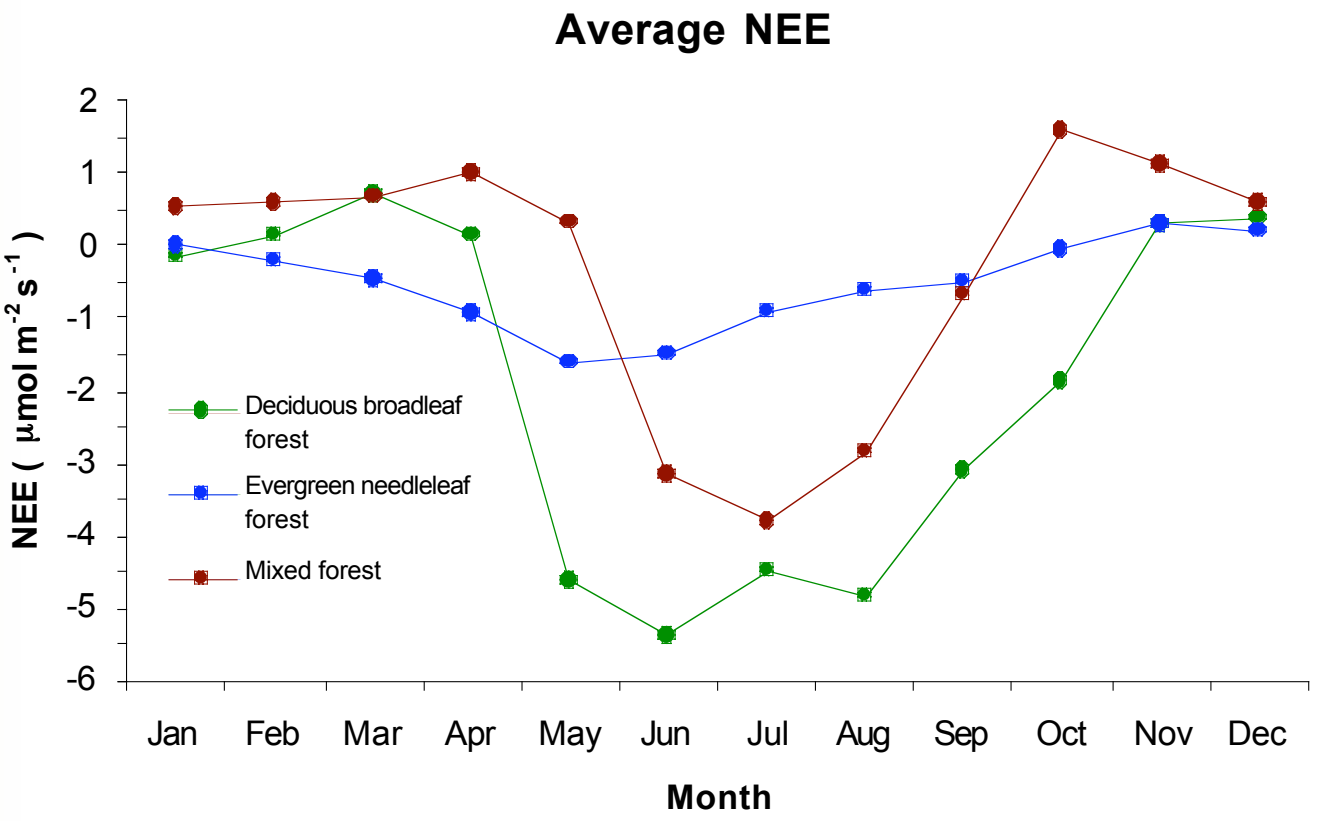
Other applications



Observations by latitude



Observations by ecosystem type



Questions?